

### **Remarks**

The present application has been reviewed in light of the final Office Action mailed on October 16, 2007. By the foregoing amendments, claims 1, 8, and 39 are amended, claim 7 canceled, and claim 41 newly introduced. Claims 1-4, 8-15, and 36-41 are now pending in this application after the amendments. No new matter is added by the amendments, and supports for the amendments can be found from throughout the specification, drawings, and claims as originally filed.

As detailed herein below, Applicant respectfully submits claims 1-4, 8-15 and 36-41, as amended, are patentable and in condition for allowance. Applicant sincerely requests the Examiner to reconsider the rejections in view of the foregoing amendments and the following remarks.

### **Rejection Over Hattori in view of Asar**

Claims 1-4, 7-15 and 38-40 are again rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Hattori (US Patent No. 6,212,751) in view of Asar (US Patent No. 6,434,264). Applicant respectfully traverses the rejection. Moreover, independent claim 1 is amended by the foregoing amendments to further highlight novel aspects of the invention over the references of record. Applicant respectfully submits all of the pending claims, namely claims 1-4, 8-15 and 36-41 as amended, are patentable over the references of record.

The present invention as claimed is directed to an apparatus for positioning back-up pins on a support plate for supporting a circuit board thereon. Independent claim 1 and claims dependent there-from (namely, claims 1-4, 8-15 and 38-40) each requires, among the elements recited, (i) that a control unit have a display unit connected for displaying the surface images of the circuit board taken by the camera, in

which the surface images include a first image representative of a portion of the surface of the circuit board and a second image representative of substantially the entire surface of the circuit board; (ii) that the control unit include a user interface coupled with an input device for allowing a user to allocate a plurality of support locations for supporting the circuit board with the back-up pins by selecting, with the input device, support locations not interfering with parts disposed on the circuit board while viewing the first image and the second image of the circuit board displayed on the display unit; and (iii) that a transfer member be coupled with the control unit for transferring a plurality of back-up pins from the back-up pin stand to the previously-allocated non-interfering support locations on the back-up pin plate.

The primary reference cited, namely, Hattori (US Patent No. 6,212,751) discloses a method and an apparatus for positioning board-support pins, examining the position of support pins, and subsequently correcting the positions of the board-support pins (112/201) which were previously positioned on a board-support base (110/202) for supporting a printed-circuit board.

Applicant respectfully submits that Hattori fails to disclose or teach, among other limitations, at least the above-identified elements (i), (ii), and (iii) of the invention as claimed.

Firstly, Hattori fails to disclose or teach **the above-identified element (i)** of the invention as claimed. As acknowledged by the examiner, nowhere in the Hattori reference includes any suggestion that its display device (186) can display multiple surface images of circuit board 24 in which the multiple surface images include a first image representative of a portion of the surface of the circuit board 24 and a second image representative of substantially the entire surface of the circuit board 24. In contrast, Hattori teaches the use of a CCD camera 56, which takes only the image of the board-support pins 112 and reference board marks provided on the printed-circuit

board so as to detect a position of the circuit board for subsequent judgment and correcting the position of the board-support pins. However, the CCD camera 56 does not take the required multiple surface images of the circuit board, namely, both a first image representative of a portion of the surface of the circuit board and a second image representative of substantially the entire surface of the circuit board, for the purposes of allocating adequate support locations not interfering with parts on the circuit board. Hattori is entirely silent and ignorant of this novel feature of allocating non-interfering pin support locations based on the first and second images taken by the camera. Therefore, Hattori clearly fails to disclose or teach the above-identified element (i) of the invention as claimed.

Hattori further fails to disclose or teach **the above-identified element (ii)** of the invention as claimed. Hattori is entirely ignorant of, and thus fails to disclose or teach, the above-identified element (ii) of allocating (before positioning the pins) a plurality of non-interfering support locations by selecting, with the input device, plural non-interfering support locations while viewing the first image and the second image of the circuit board displayed on the display unit.

With reference to FIGS. 12 and 13 of Hattori, the Examiner has again alleged that Hattori teaches this requirement. See Office Action, item b) on pages 3-4. However, regardless of the Examiner's allegation, Applicant respectfully submits that FIGS. 12 and 13 teach only methods of examining a position of a board support pin after the pin was positioned in a previous step. This Hattori disclosure is not related at all to any allocation of non-interfering support locations before positioning the back-up pins while viewing the first and second images as recited by the above element (ii).

Hattori further fails to disclose or teach **the above-identified element (iii)** of the invention as claimed. Because Hattori is entirely ignorant of the above element (ii) of allocating non-interfering support locations while viewing the first image and the

second image of the circuit board displayed on the display unit, it fails to disclose or teach the above-identified element (iii) of transferring a plurality of back-up pins from the back-up pin stand to the previously-allocated non-interfering support locations on the back-up pin plate.

As detailed above, Hattori does not disclose or teach, among others, any of the above identified **elements (i), (ii) and (iii)** of the invention as claimed in claims 1-4, 8-15, and 36-40. Thus, claims 1-4, 8-15, and 36-40 are patentably distinct over Hattori.

Now referring to the secondary reference Asar (US Patent No. 6,434,264), Asar discloses a vision comparision inspection system for inspecting or identifying defects in a printed circuit assembly line. Asar is cited by the Examiner as to consider if it would disclose a display unit that displays a first image representative of a portion of the surface of the circuit board and a second image representative of substantially the entire surface of the circuit board as recited in the above element (i).

Applicant respectfully submits that, as is the same with Hattori discussed above, Asar also fails to disclose or teach, among other limitations, the above element **(ii)** requiring: allocating, before positioning the pins, a plurality of non-interfering support locations by selecting, with the input device, plural non-interfering support locations while viewing the first image and the second image of the circuit board displayed on the display unit. In contrast, Asar is concerned to solve an entirely different problem (namely, inspecting or identifying defects in a printed circuit assembly line) and totally ignorant of the above identified features of the present invention. Asar is entirely ignorant of the claimed feature of the allocation of pin support positions onto a plurality of non-interfering support locations while viewing the first and second images.

Applicant further submits that, as is Hattori discussed above, Asar also fails to disclose or teach, among other limitations, the above element **(iii)** requiring:

transferring a plurality of back-up pins from the back-up pin stand to the previously-allocated non-interfering support locations on the back-up pin plate. Asar is concerned to solve an entirely different problem (namely, inspecting or identifying defects in a printed circuit assembly line) and totally ignorant of the above identified features of the present invention.

As discussed above, **Hattori** and **Asar** each fails to disclose or teach, among other limitations, at least **the above-identified elements (ii) and (iii)** of the invention as claimed. Accordingly, because Hattori and Asar, either alone or in combination with each other, fails to disclose each and every element of independent claim 1, claims 1-4, 8-15, and 36-40 are patentable over these references of record.

Moreover, as discussed above, Asar is concerned to solve an entirely different problem associated with a vision inspection system for inspecting a printed circuit assembly, and not related at all to an apparatus for allocating and positioning back-up pins on a support plate for supporting a circuit board thereon. Because Asar concerns to solve entirely different problems, one of ordinary skill in the art would not find any motivation to examine the Asar disclosure in order to modify or combine with the teachings of Hattori, and thus, to arrive at the invention as claimed.

In summary, the present invention requires the novel features of: allocating plural support locations of the back-up pins by selecting, with the input device, non-interfering support locations while viewing at least the first image and the second; subsequent transferring a plurality of back-up pins from the back-up pin stand to the previously-allocated non-interfering support locations on the back-up pin plate, while utilizing the surface images taken by a camera, which includes a first image representative of a portion of the surface of the circuit board and a second image representative of substantially the entire surface of the circuit board, as respectively recited by the above elements (i), (ii) and (iii).

In clear contrast to the claimed invention, Hattori clearly fails to teach the above elements **(i), (ii) and (iii)** of the present invention. Moreover, Asar also fails to teach the above elements **(ii) and (iii)** of the present invention. Therefore, claims 1-4, 8-15, and 36-40 are patentable under 35 U.S.C. 103(a) over Hattori in view of Asar. Furthermore, as Asar is concerned to solve entirely different problems, and not related to any allocation of the support pin locations, there would be no motivation recognizable by one of ordinary skill in the art to combine or modify the references to include any of the missing elements, such as the above elements (ii) and (iii), in order to reach at the invention as claimed.

Moreover, Applicant further submits that, in order to reject a claim in view of prior art, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). To establish a prima facie case of obviousness under 35 U.S.C. 103, the prior art reference must teach or suggest all the claim limitations. When evaluating claims for obviousness under 35 U.S.C. 103, all the limitations, including any functional terms therein, of the claims must be considered and given weight. *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983) *aff'd mem.* 738 F.2d 453 (Fed. Cir. 1984). See also MPEP 2143 et seq.

Accordingly, Applicant respectfully submits that Hattori and Asar each fails to disclose or teach at least the above elements (ii) and (iii) of claims 1-4, 8-15, and 36-40, and thus, these claims are patentable over the references of record.

### **Lack of Motivation to Combine or Modify the Prior Art Teachings**

In rejecting the claims, the Examiner has alleged that Asar teaches the display unit (240) that displays a first image representative of a portion of the surface of the circuit board (52) and a second image representative of substantially the entire surface

of the circuit board (52) "for allowing user/operator rapidly inspect the surface of the circuit board." The Examiner then alleged that, therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Hattori by utilizing the display unit and display technique as taught by Asar "for allowing user rapidly inspect the surface of the circuit board." Office Action of May 3, 2007 (at pages 3-4) which is reincorporated by the present Office Action. Also, see a similar allegation made in the present Office Action, item #3 (a) at page 3.

Applicant respectfully traverses at least because the Examiner fails to specify what would be the motivation to modify Hattori to include the missing elements of claim 1 (namely, the above elements (i) and (ii)) to reach at the claimed invention. Moreover, Examiner further fails to specify any desirability of such motivation to combine or modify the references. Applicant submits that there is no suggestion or teaching in Hattori and Asar that modification would be desirable. Asar teaches the use of multiple screens showing different views of a circuit board. However, this is only for **inspecting** defects on the circuit board, but not related at all to allocating back-up pins for subsequent positioning of the pins on a support plate. **Because Asar concerns to solve entirely different problems, one of ordinary skill in the art would not find any motivation to examine the Asar disclosure in order to modify or combine with the teachings of Hattori, and thus, to reach at the invention as claimed.**

In this regard, it is well established that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination or modification. *In re Mill*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). See also *MPEP 2143.01*. As discussed above, the prior does not suggest the desirability of the combination or modification. To the contrary, at least because Asar concerns to solve entirely different problems, one of

ordinary skill in the art would not find any motivation to examine the Asar disclosure in order to modify or combine with the teachings of Hattori.

It is also well settled that a statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000). See also *MPEP 2143.01*. As discussed above, the Examiner fails to specify objective reasons for the combination or modification.

#### **Patentability of New Claim 41**

Applicant submits that new claim 41 includes claim limitations basically similar to the above identified elements (i), (ii) and (iii), however with certain modifications thereof, and comprises further limitations as recited. Accordingly, Applicant respectfully submits that new claim 41 is also patentable over the references of record at least under similar reasons as detailed above. Moreover, the cited references further fail to teach further limitations added in claim 41, for example, such as: (a) a first image depicting in real time of a portion of the surface of the circuit board where the camera is currently assigned; (b) a second image representative of substantially the entire surface of the circuit board, the second image composed of a plurality of real-time images taken by the camera; (c) wherein the display unit displays the first image at one side of the display unit and the second image on another side of the display unit for allowing the user to view the first image and the second image simultaneously for facilitating the allocation of support locations; (d) wherein the input device includes a mouse or digitized input device which allows the user to move a mouse pointer to a



position on the second image of the circuit board displayed on the display unit; (e) wherein the control unit further enables the camera to move to a location for taking a real time image of a portion of the circuit board where the mouse pointer is located for subsequently selecting the support locations by clicking the mouse while viewing the real time image of the portion of the circuit board displayed on the display unit.

### **Conclusion**

For the foregoing reasons, Applicant sincerely submits that all pending claims, namely claims 1-4, 8-15 and 36-41, are patentable over the references of record and in condition for allowance. Favorable reconsideration of the Office Action is earnestly solicited.

### **Request for Interview**

Applicant respectfully requests a telephonic interview prior to a further Official Action, if one would be issued in order to resolve the present prosecution, and would greatly appreciate the Examiner contacting the undersigned attorney to arrange such an interview.

Respectfully submitted,



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